Nov. 30, 1937. A. FRIEDMAN 2,100,439

BLOWER OR FAN

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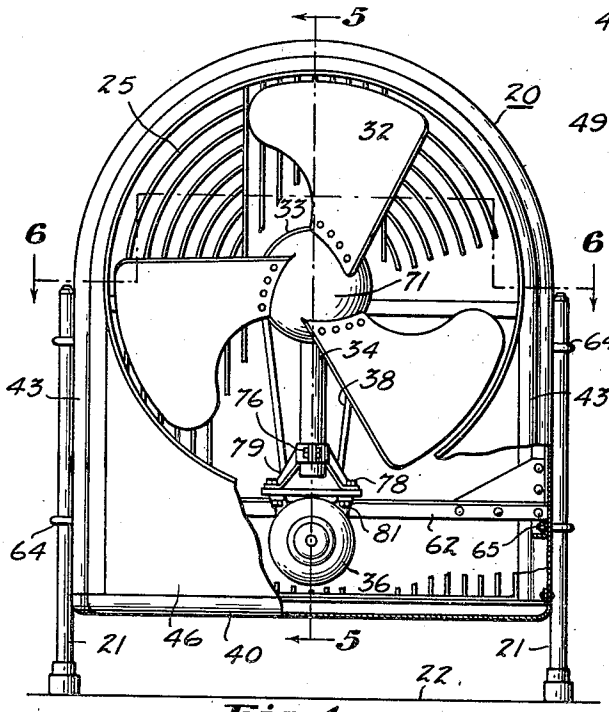


Fig. 1

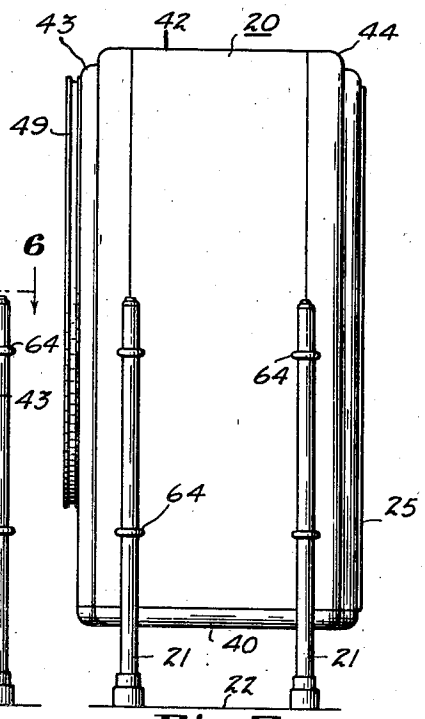


Fig. 2

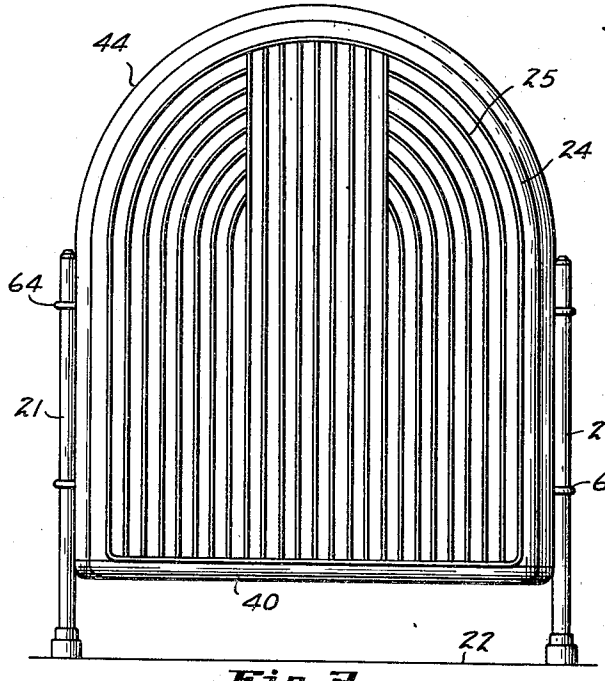


Fig. 3

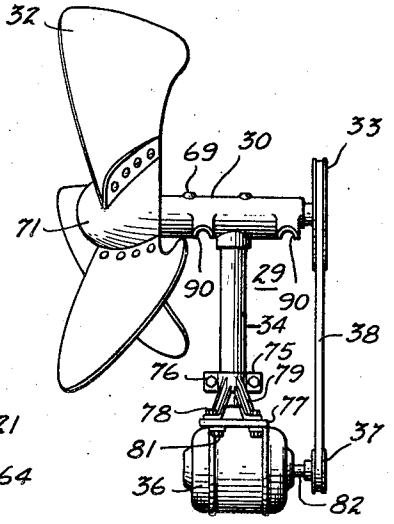


Fig. 4

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BLOWER OR FAN

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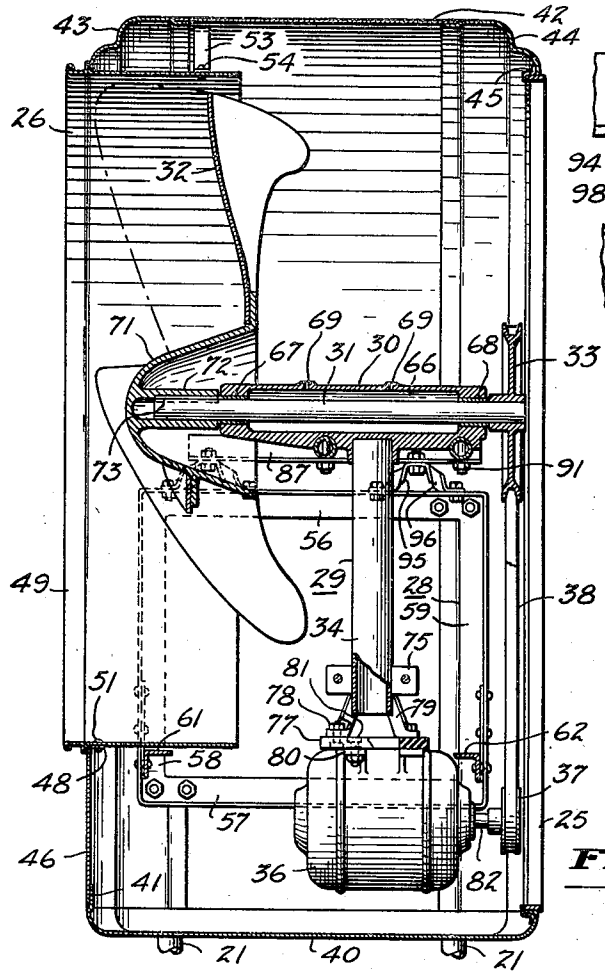


Fig. 5

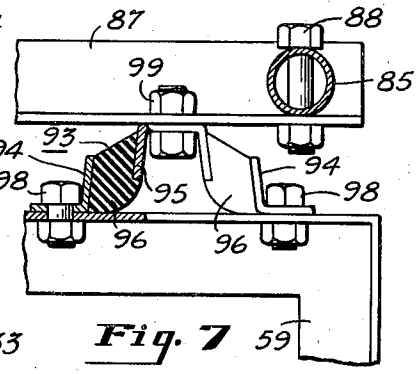


Fig. 7

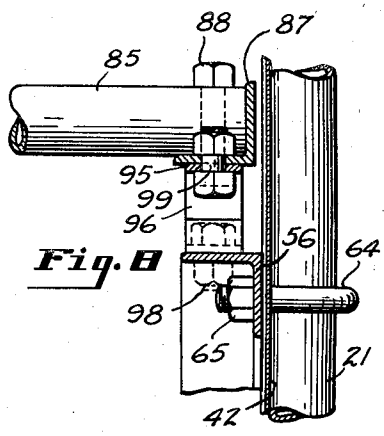


Fig. 8

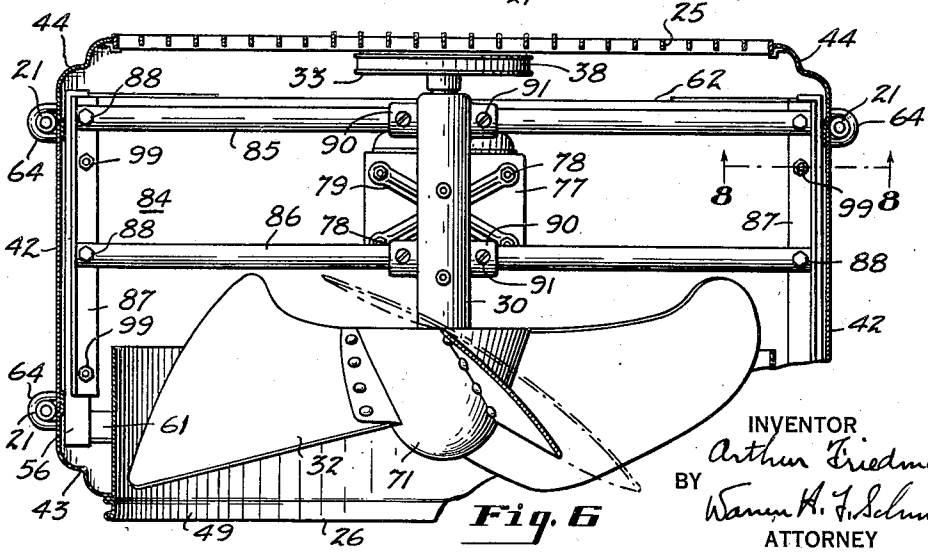


Fig. 6

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UNITED STATES PATENT OFFICE

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BLOWER OR FAN

Arthur Friedman, Shaker Heights, Ohio, assignor to Air Controls, Inc., Cleveland, Ohio, a corporation of Ohio

Application September 14, 1935, Serial No. 40,558

4 Claims. (Cl. 230—117)

The present invention relates to blowers, particularly to relatively large size blowers, such as that employed in residences for circulating air throughout the entire house. Usually such type blower is placed in the attic of the house for withdrawing warm air from the rooms, into the attic, through the blower and expelling same from the attic.

One of the objects of the present invention is to provide a unitary structure including a fan and a driving motor therefor which can be inserted and withdrawn from the blower as a unit.

Another object of the invention is to provide a unitary structure in which the fan shaft bearing carries the motor and the fan and in which the bearing is utilized for attaching the unitary fan and motor structure within the interior of the blower casing.

In carrying out the foregoing object, it is the further object of the invention to resiliently support the bearing within the casing.

A still further object of the present invention is to support the unitary structure, including the fan, motor and driving connections, so that the structure can oscillate about the center of oscillation thereof and in carrying out this object the structure is resiliently supported on opposite sides of such axis.

Another object of the present invention is to provide a common fastening means for adjustably holding the support for the blower in position and for rigidly attaching a supporting frame within the casing.

Other and further objects and advantages will be apparent from the following description reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

Fig. 1 is a front view of the improved blower parts thereof being broken away to show the driving motor.

Fig. 2 is a side view of the blower.

Fig. 3 is a rear view.

Fig. 4 is a side view of the unitary structure including a fan, a motor and the driving connections therebetween.

Fig. 5 is the sectional view taken on lines 5—5 of Fig. 1.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 1, the fan being shown in elevation.

Fig. 7 is a detailed view of the resilient mounting means as looking from the left of Fig. 8, and Fig. 8 is a sectional view taken on line 8—8 of Fig. 6.

Referring to the drawings in general, there is shown a blower including a casing 20 which is supported by four legs 21 upon a floor 22. The blower is provided in the rear with an air opening 24 covered by a grill 25, and is provided in front with an air outlet opening 26. A frame 28 is carried within the casing 20 and supports the fan and motor unit. This unit is shown in Fig. 4 and includes a bearing 30, in which the fan shaft 31 is journaled. The front end of the shaft 31 carries the fan 32 and the rear end carries a driving element shown as a pulley 33. A standard 34 depends from the bearing 29 and carries the motor 36 having a driving pulley 37, which drives the pulley 33 by the belt 38.

Referring more in detail to the drawings, the casing 20 is formed of sheet metal and comprises four major parts including the bottom pan 40, having upturned flanges 41, the wide U-shaped center part 42, the front end rim 43, and rear end rim 44. The bottoms of part 42 and end rims 43 and 44 overlie the flange 41, and are secured thereto as by rivets or by welding. The end rims 43 and 44 are joined to the center part 42, either by rivets or by welding. If desired, a seam weld can be made at this joint or the parts may be made to overlap as shown. The rims 43 and 44 are identical in construction and are interchangeable. The rims 43 and 44, and the center piece 42, when joined to the pan 40, form the sides, top and bottom of the casing 20. A grill 25 is removably attached between the inner edges of the rim 44 and the upper edge of pan 40 and this grill forms a guard for the rear of the casing 20. This grill may be removably held in position by clips 45. A sector or panel 46, is suitably secured to the inner edges of the rim 43, and to the flange 41 of pan 40. The upper end of the panel 46, is semi-circular in shape and is provided at this point with a rearwardly extended flange 48, which is semi-circular in shape. This semi-circular flange 48 and the semi-circular inner edge of rim 43 form a circular opening which receives a shroud or fan ring 49. This fan ring 49 is suitably secured to the flange 48, as by rivets 51. The rear and upper end of the ring 49 is braced by a brace 53, which is suitably secured to the center part 42 and to the ring 49, as by rivets 54. Ring 49 forms the outlet of the fan casing. It extends a short distance beyond the rim 43 and panel 46 for the purpose of attaching a canvas extension because it is desirable in some installations to connect the fan outlet directly with an opening in the building.

The frame 28, which supports the fan and motor assembly, comprises like parts disposed on

opposite sides of the casing and these like parts each include a square sub-frame of angle iron including an upper horizontal run 56, a lower horizontal run 57 and vertically disposed front run 58, and rear run 59 connecting the upper and lower runs 56 and 57. The lower ends of opposed runs 58 are connected with angle iron braces 61 which extend across the blower and the lower ends of the runs 59 are connected together by like angle iron braces 62.

Thus this frame provides for increased rigidity of the casing, the runs 56 to 59 strengthen the sides of the casing and the braces 61 and 62 rigidly attach the opposed sides of the casing with one another.

Two sets of holes are provided in each of the runs 56 and 57 for receiving U shaped bolts 64. These U shaped bolts are disposed about the supports 21 and extend through registering holes in the center part 42, and rims 43 and 44 of the casing and through the holes in the runs 56 and 57. Therefore, the holes in the center part 42 and rims 43 and 44 locate the position of the bolts and therefore locate the position of the frame 28. Nuts 65 are threaded on both ends of each of the bolts and when tightly drawn, they hold the supports 21 and the frame 28 rigidly in position. By loosening the bolts 65, the supports 21 can be moved vertically for adjusting the position of the same with respect to the floor. It will be readily apparent that the supports 21 may extend upward if desired for the purpose of hanging the blower from an upper support such as the ceiling.

Referring now in detail to the fan and motor assembly 29, the bearing 30, is hollow to form a lubricant chamber 66 which carries bearing bushings 67 and 68 in the opposite ends thereof. Holes 69 are formed in the upper part of the bearing 30 for the purpose of injecting oil or grease. The bushings 67 and 68 may be formed of lubricant impregnated metal having a porosity suitable for passing oil therethrough to the inner surface thereof when heated. The shaft 31 is journaled in the bearing bushings 67 and 68 and the fan and the pulley 33 are secured to opposite ends of the shaft by set screws (not shown).

It will be noted that the nose or hub 71 of the fan 32 is hollow and is provided with a rearwardly hollow boss 72 which is keyed to the shaft 31 by key 73. A set screw (not shown) seams the fan 32 to shaft 31. By hollowing out the hub 71, as shown, the bearing bushing 69 can extend forwardly a considerable distance whereby the bushings 67 and 68 can be spaced a substantial distance from one another and in this manner providing a long wearing bearing for the shaft 31.

Extension 34 for the motor 36 depends from the bottom part of the bearing 30. This extension is in the form of a pipe which is threaded into a blind hole in the bottom part of bearing 30. Two motor supporting brackets 75 surround the lower part of pipe 34 and are clamped together with bolts 76 so as to tightly grip the pipe 34. A rubber mounting 77 is secured by bolts 78 to extensions 79 of brackets 75, and, the motor 36 is provided with brackets 80 which are secured to the rubber mounting 77 by bolts 81. The bolts 81 and brackets 80, are supported from the extensions 79 and bolts 78 whereby the motor is carried entirely by the rubber. The pulley 37 on the shaft 82, of motor 36, is aligned with pulley 33 on the fan shaft 31. The motor 36 can be slid vertically on extension pipe 34 to adjust the tension of belt 38 when the bolts 76 are loosened.

Thus it will be seen that the fan 32, its bearing 30, the motor 36 and the driver connections with the fan shaft comprises an unitary structure and this unitary structure can be inserted or removed from the interior of the casing through the rear opening 24 of the casing when the grill 25 is removed.

The unitary fan and motor structure 29 is carried by frame 28. A frame generally indicated at 84 is attached to the bearing 30 and is resiliently supported on the frame 28. This frame comprises brackets in the form of pipes 85 and 86. The opposed outer ends of each are connected to angle iron strips 87. These pipes 85 and 86 are secured to the strips 87 by having bolts 88 extend through the pipes and through angle iron strips 87. The bearing 30 is provided with a plurality of opposed extensions 90, the lower portions of which and that of the bearing 30 are cut out so as to form semi-circular depressions for receiving the pipes 85 and 86 and the bearing 30 is secured to these pipes by bolts 91 which extend through the extensions 90 and the pipes 85 and 86.

The frame 84, carrying the unitary structure 29, is attached to the casing 20 by resilient couplings 93. The upper flanges of angle iron strips 56 each carry two mounting couplings 93. These couplings each include clips 94 and 95 and insulating blocks of material such as rubber 96. The clips 94 are secured to strips 56 by bolts 98 and the clips 95 are U shaped and are attached to strips 87 by bolts 99. Preferably, the blocks of rubber 96 are molded to the clips 94 and 95. By this construction vibration of the unit 29 is materially dissipated in the rubber blocks 96 and thus the blocks 96 insulate the casing 20 from the vibrating effects of the unit 29.

It will be noted that the insulation couplings between the unit 29 and the casing 20, are spaced a considerable distance from one another on both sides of the frame. It has been found that when the motor and fan are in operation, the unitary fan and motor construction has a definite oscillation. This oscillation is centered about an axis running transversely and substantially at right angles to the axis of the shaft 31. This axis is in a substantially horizontal plane and it has been found that by disposing the rubber couplings at equal distances on opposite sides of this axis of oscillation, that the rubber couplings permit an oscillatory movement of the unit and this oscillatory movement has the effect of preventing or minimizing noise producing vibration of the unitary structure, and therefore, by virtue of the mounting disclosed, the transmission of vibration to the casing is minimized.

It is apparent from the foregoing that there has been provided a blower which is compact in construction while still a relatively long shaft bearing is provided. By providing a hollow or dish-out hub 71 for the fan 32, the bearing 30 and likewise the bearing bushing 67 can extend a considerable distance into and beyond the rear ends of the fan blades. In this manner a long bearing is provided by the fan shafts to insure the long life of the bearing bushings and shaft. Also by spacing the rubber coupling and the fan and motor unit 29 on opposite sides of the axis of oscillation of the unit, noises and the creation of noises are minimized and also the durability of the blower is enhanced. Furthermore, by the provision of the unitary fan and motor unit 29, all of the working parts of the blower can be assembled as such outside the casing and inserted

therein as a unit. Likewise, such unit can be removed as a unit for the ready repair thereof.

While the form of embodiment herein disclosed constitutes a preferred form, it is to be understood that other forms may be adopted, all coming within the scope of the claims which follow.

What I claim is:

1. A blower comprising in combination, a sheet metal casing having side, top and bottom walls, the rear and front of said casing being open for the ingress and egress of air; a frame within the casing including horizontally extending bracing elements disposed along the side walls of the casing, and horizontally extending bracing elements disposed between the top and bottom walls of the casing and extending between the side walls; said last named bracing elements being connected to said first named bracing elements to form said frame, means for connecting said frame to said casing; a fan and power unit disposed within the casing; said unit including a shaft bearing, a shaft journaled therein, a fan and a driven element carried by the shaft, a motor for driving the driven element and carried by the bearing; and means for resiliently supporting the bearing on said frame.

2. A blower comprising in combination, a sheet metal casing having side, top and bottom walls, the rear and front of said casing being open for the ingress and egress of air; a frame mounted within the casing including horizontally extending bracing elements disposed along the side walls of the casing, and horizontally extending bracing elements disposed connected to the first bracing elements and disposed below them and between the top and bottom walls of the casing and extending between the side walls; a fan and power unit disposed within the casing, said unit including a shaft bearing, a shaft journaled therein, a fan and a driven element carried by the shaft, a motor for driving the driven element and carried by the bearing; and means for resiliently supporting the bearing on the upper bracing elements.

3. A blower comprising in combination, a casing having openings for the ingress and egress of air, a frame within the casing, a fan and a motor therefor within the casing and carried by the frame, supports for carrying the blower, common attaching means for each support and the frame, said supports having adjustable sliding connections with said means when said means are loosened and having impinging association therewith when the means tightly secures the frame in position.

4. A blower comprising in combination, a casing having openings for the ingress and egress of air, a frame within the casing, a fan and a motor therefor within the casing and carried by the frame, supports for carrying the blower, a loop type bolt about each of said supports, said supports being slidable in the loops, said bolts being attached to the frame, and nuts for said bolts for binding the supports in adjusted position and for securing the frame to the casing.

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